

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



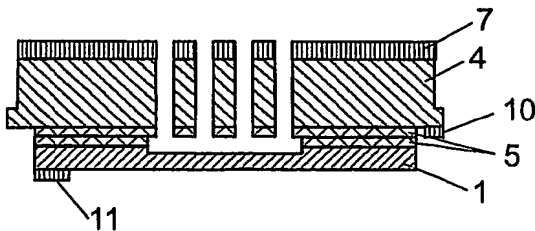
(43) International Publication Date  
2 December 2004 (02.12.2004)

PCT

(10) International Publication Number  
**WO 2004/105428 A1**

- (51) International Patent Classification<sup>7</sup>: **H04R 19/04** (74) Agent: **DREW & NAPIER LLC**; 20 Raffles Place, #17-00 Ocean Towers, Singapore 048620 (SG).
- (21) International Application Number: **PCT/SG2004/000152** (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: 26 May 2004 (26.05.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 200302854-5 26 May 2003 (26.05.2003) SG (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant (*for all designated States except US*): **SENS-FAB PTE LTD** [SG/SG]; 85 Science Park Drive, #01-01 The Cavendish, Singapore 118259 (SG).
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): **KOK, Kitt-Wai** [SG/SG]; Block 168, Stirling Road, #08-1177, Singapore 141168 (SG). **ONG, Kok, Meng** [MY/SG]; Block 17, Teck Whye Lane, #12-157, Singapore 680017 (SG). **SOORIAKUMAR, Kathirgamasundaram** [US/SG]; 40 Ashwood Grove, Singapore 738349 (SG). **PATMON, Bryan, Keith** [US/SG]; 40 Ashwood Grove, Singapore 738349 (SG).
- Published:  
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: **FABRICATION OF SILICON MICROPHONES**



(57) Abstract: A silicon microphone is formed using the steps of providing a first wafer including a layer of heavily doped silicon, a layer of silicon and an intermediate layer of oxide between the two silicon layers. The first wafer has a first major surface on one surface of the layer of heavily doped silicon and a second major surface on the layer of silicon. A second wafer of silicon has a first major surface and a second major surface. A layer of oxide is formed on at least the first major surfaces of the first and second wafers. A cavity is etched through the oxide layer on the first major surface of the first wafer and into the layer of heavily doped silicon. The first major surface of the first wafer

is bonded to the first major surface of the second wafer. A metal layer is formed on the second major surface of the second wafer. Acoustic holes are patterned and etched in the metal layer and in the second major surface of the second wafer. At least one electrode is formed on the heavily doped silicon of the first wafer and at least one electrode is formed on the second wafer. The oxide layer of the first wafer is etched from at least the back of a diaphragm during manufacturing of the silicon microphone.